

The Effect of Different Stocking Densities on Life and Absolute Weight Growth of Gurami Fish Fingerlings (*Osphronemus gouramy*)

Pengaruh Padat Penebaran Yang Berbeda Terhadap Kelulushidupan Dan Pertumbuhan Berat Mutlak Benih Ikan Gurami (*Osphronemus gouramy*)

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ABSTRACT

Gouramy has long been cultivated by fish breeders in Indonesia, but there are still many obstacles faced by these fish breeders, namely the very slow growth rate when compared to other freshwater fish. One effort to find out the factors that affect the slow growth rate of fish, among others, is to treat the stocking density of fish fingerlings. Not much is known about the optimal stocking density for gouramy fingerlings. This study aims to determine the effect of different stocking densities on survival and growth in absolute weight of gourami (*O. gouramy*) fry. The method used was using RAL (Completely Randomized Design), using 4 treatments, 6 replications. The results showed that the survival rate for treatment A gave the highest yield of 91.6% and the highest weight gain was found in treatment A with the highest yield of 3.87 grams. The water quality of all treatments during the study showed a decent and good enough range for the growth of gouramy, namely the pH ranged from 7.56 – 7.61, the temperature ranged from 26.1 – 26.2°C, and the DO ranged from 5.19 – 5.29 ppm.

ABSTRAK

Ikan gurami sudah lama dibudidayakan oleh peternak ikan di Indonesia, namun masih banyak kendala yang dihadapi oleh peternak ikan tersebut adalah laju pertumbuhan yang sangat lambat bila dibandingkan dengan ikan air tawar lainnya. Salah satu upaya untuk mengetahui faktor-faktor yang mempengaruhi laju pertumbuhan ikan yang sangat lambat antara lain dengan memberi perlakuan pada padat penebaran benih ikan. Padat penebaran benih ikan gurami optimal masih belum banyak diketahui. Penelitian ini bertujuan untuk mengetahui pengaruh padat tebar berbeda terhadap kelulushidupan dan pertumbuhan berat mutlak benih ikan gurami (*O. gouramy*). Metode yang dilakukan adalah menggunakan RAL (Rancangan Acak Lengkap), menggunakan 4 perlakuan, 6 ulangan. Hasil penelitian menunjukkan bahwa tingkat kelulushidupan perlakuan A memberikan hasil tertinggi sebesar 91,6% dan penambahan berat tertinggi terdapat pada perlakuan A hasil tertinggi sebesar 3.87 gram. Kualitas air dari seluruh perlakuan selama penelitian menunjukkan kisaran yang layak dan cukup baik untuk pertumbuhan ikan gurami yaitu pH berkisar antara 7,56 – 7,61, suhu berkisar antara 26,1 – 26,2°C, dan DO berkisar antara 5,19 – 5,29 ppm.

Kata Kunci	<i>Padat Tebar, Benih Ikan Gurami, Kelulushidupan, Pertumbuhan Berat Mutlak</i>
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INTRODUCTION

Aquaculture is an important activity to meet the food needs of the fisheries sector. In the last decade, fishery production from the aquaculture sector has increased, while captured fishery production has tended to stagnate or even decline (Hernawati & Suantika, 2007).

Gourami productivity is lower compared to other types of freshwater fish such as goldfish and tilapia. This happens because the maintenance techniques currently used by farmers are conventional methods. Apart from that, other obstacles that are often faced in the industrialization of this commodity are the high mortality rate at the larval and fingerling stages and the slow growth rate (Insan, 2002 in Khairuman & Amri, 2005).

One effort to find out the factors that influence the very slow growth rate of fish includes treating fish fingerling stocking density. The optimal stocking density of gourami fish fingerlings is still not widely known. Although increasing stocking density can cause fish to experience stress, for example friction between fish occurs when a shock occurs. Apart from that, increasing stocking density also has implications for increasing the organic material load from leftover feed and fish waste so that it can reduce the carrying capacity of the pond (Effendie, 1978).

METHODS

The method used in this research is the experimental method. This research consisted of 4 treatments with 6 repetitions each. The treatment given is:

A = stocking density of 4 birds / 16 liters

B = stocking density of 8 fish / 16 liters

C = stocking density of 12 birds / 16 liters

D = stocking density of 16 birds / 16 liters

Research Procedure

The tools used are plastic tubs, DO meters, pH meters, rulers, digital scales, digital scales, aeration equipment and trays. The material used is gourami fish fingerlings with an initial weight of 1.9 grams. Fish are fasted for one day to empty the stomach. The test fish measured an average weight of 1.9 grams/fish, then put them in the experimental tank. Feeding is 3% of the biomass weight, with a feeding frequency of 2 times a day, namely in the morning (50%) and afternoon (50%). Water quality measurements include temperature, pH and dissolved oxygen (DO) which are carried out every two days in the morning and evening. Water changes are carried out by siphoning every 5 days. Furthermore, to replace the lack of water volume due to the siphoning process, each experimental tank had its water volume added with fresh water until it returned to the

initial volume. At the end of the research, the test fish were then measured for final weight and survival after being treated with stocking density.

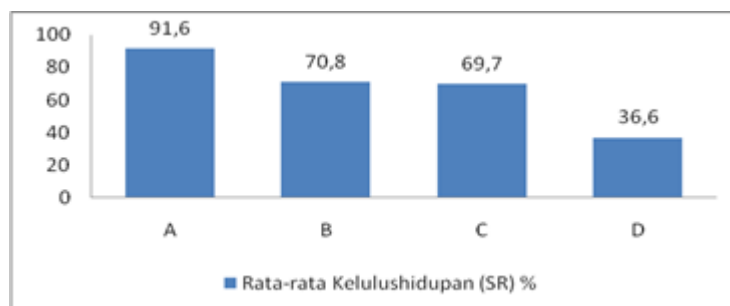
RESULT AND DISCUSSION

The Effect of Different Stocking Densities on the Survival of Gourami Fish Fingerlings (*Osphronemus gouramy*)

The results of research on the effect of different stocking densities on the survival of gourami (*Osphronemus gouramy*) fish fingerlings obtained the following data: treatment A = 91.6%, treatment B = 70.8%, treatment C = 69.7%, and treatment D = 36.6%. The range of values, averages and standard deviations of the effect of different stocking densities on the survival of gourami fish fingerlings (*Osphronemus gouramy*) are in Table 1.

Table 1. Range of values, average and standard deviation of the effect of different stocking densities on the survival of gourami (*Osphronemus gouramy*) fingerlings for each treatment and replication.

Treatment	Life Range of Gourami Fish Fingerlings (<i>Osphronemus gouramy</i>)	Average Survival (SR) %	Standard Deviation (DS)
A	75-100	91,6	12,90994
B	50-87,5	70,8	17,07825
C	50-93,75	69,7	15,52048
D	20-50	36,6	11,69045



From this table it can be discussed that treatment A gave the highest results on the survival rate of Gourami fish fingerlings (*Osphronemus gouramy*) at 91.6%. This is in accordance with research by Hernowo & Rachmatun (2008) , if the availability of feed is always sufficient then the success rate of rearing can be close to 100%, in fact no one dies or disappears, while in treatment D the lowest survival rate is estimated because the higher the stocking density will increase competition for space. motion. This is in line with Effendi's (1978) statement that the things that fish compete for are food, nests or spawning places and space to move around.

The results of the 5% BNT test calculation influence different stocking densities on the survival of gourami (*Osphronemus gouramy*) fingerlings, while the differences in average notation can be seen in Table 2 below.

Table 2. Different notations for the results of the 5% BNT test on the effect of different stocking densities on the survival of gourami fish fingerlings (*Osphronemus gouramy*)

Treatment	N	Subset for alpha = 0.05		
		1	2	3
D	6	36,6667		
C	6		69,7917	
B	6		70,833	
A	6			91,6667
Sig.		1	0,536	1

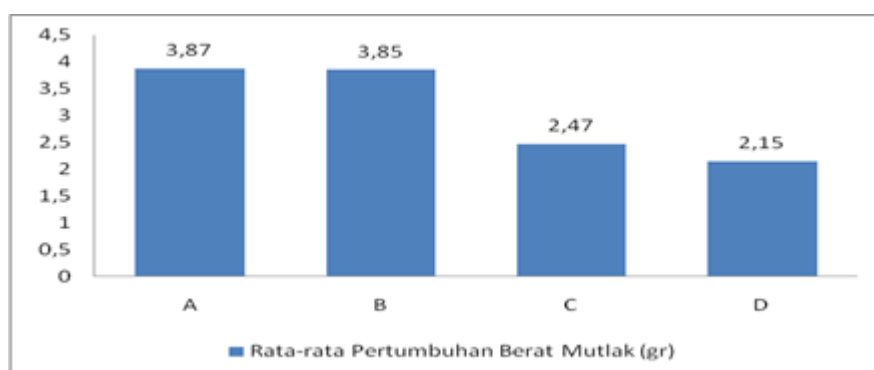
From the table above it can be concluded that the effect of different stocking densities on the survival of gourami (*Osphronemus gouramy*) fingerlings for treatment B is the same as treatment C and different from treatment A and treatment D.

The Effect of Different Stocking Densities on the Absolute Weight Growth of Gourami Fish (*Osphronemus gouramy*) Fingerlings

The results of research on the effect of different stocking densities on the absolute weight growth of gourami (*Osphronemus gouramy*) fingerlings obtained the following average weight data: treatment A = 3.87 gr, treatment B = 3.85 gr, treatment C = 2.47 gr, and treatment D = 2.15 gr. The range of values, average growth and standard deviation of the effect of different stocking densities on the growth of gourami (*Osphronemus gouramy*) fish fingerlings is in Table 3.

Table 3. Range of values, average and standard deviation of the effect of different stocking densities on the absolute weight growth of gourami (*Osphronemus gouramy*) fry for each treatment during the study.

Treatment	Absolute Weight Growth Range (gr)	Average Absolute Weight Growth (gr)	Deviation Standart (DS)
A	3,22-5,28	3,87	0,817867
B	3,16-4,03	3,85	0,341336
C	1,22-3,20	2,47	0,827212
D	1,06-3,19	2,15	0,874658



Treatment A gives higher results. In accordance with the opinion of Serdiati (2005), fish growth will be faster if kept at a low stocking density and conversely growth will be slow if the stocking density is high, while treatment D gives the lowest relative growth, which is estimated because of the stress level of the fish. at high density is greater than at

low density. Agrees with Aksungur (2007) that increasing density will cause increased stress, where there is an increase in energy which causes a decrease in growth and food utilization.

The results of the 5% BNT test calculation show the effect of different stocking densities on the absolute weight growth of gourami (*Osphronemus gouramy*) fry, while the differences in average notation can be seen in table 4 below.

Table 4. Different notations for the results of the 5% BNT test on the effect of different stocking densities on the absolute weight growth of gourami (*Osphronemus gouramy*) fingerlings.

Treatment	N	Subset for alpha = 0.05	
		1	2
D	6	2,1533	
C	6	2,47	
B	6		3,855
A	6		3,8733
Sig.		0,472	0,967

From the table above it can be concluded that the effect of different stocking densities on the survival of gourami (*Osphronemus gouramy*) fingerlings for treatment A is the same as treatment B and treatment C is the same as treatment D.

Water Quality Temperature

The water temperature is within a good tolerance range, namely between 26.1°C to 26.2°C. These results are in accordance with Agung et al., (2007), who explained that gourami fish can grow well at temperatures ranging from 25°C to 28°C.

Table 5. Average value of water temperature (°C)

Treatment	Water Temperature Range (°C)	Average Temperature (°C)	Deviation Standart (DS)
A	26,1-26,2	26,1	0,04083
B	26,1-26,2	26,2	0,05477
C	26,1-26,2	26,1	0,05164
D	26,1-26,2	26,2	0,05164

In order to find out whether there was a real difference between the water temperatures in each treatment, a 5% one-way ANOVA test was carried out and the results can be seen in Table 6.

Table 6. ANOVA (Analysis of variance) test results on temperature during the study

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	,008	3	,003	1,111	,368
Within Groups	,050	20	,002		
Total	,058	23			

From the table above, it is known that the water temperature levels in each treatment did not have a significant effect on the survival and absolute weight growth of gourami (*Osphronemus gouramy*) fry ($P > 0.05$).

Degree of Acidity (pH)

The pH value of the water during maintenance in this study ranged from 7.56 to 7.61. Based on the results of these measurements, it can be said that the pH of the water during maintenance is in the normal range. According to Effendi (2003), most aquatic biota are sensitive to changes in pH and prefer a pH value of around 7 – 8.5

The range of values, average and standard deviation of acidity levels on the survival and absolute weight growth of gourami fish fingerlings (*Osphronemus gouramy*) for each treatment are as shown in Table 7 below.

Table 7. Range of values, average and standard deviation of acidity levels for each treatment during the study

Treatment	Water pH Range	Average pH Water	Deviation Standart (DS)
A	7,56-7,61	7,59	0,01862
B	7,58-7,61	7,59	0,01265
C	7,57-7,60	7,59	0,01049
D	7,57-7,60	7,59	0,01033

Table 8. ANOVA (Analysis of variance) test results on the degree of acidity during the study

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	,000	3	,000	,269	,847
Within Groups	,004	20	,000		
Total	,004	23			

It can be illustrated that the acidity level in each treatment does not have a significant effect on the survival and absolute weight growth of gourami (*Osphronemus gouramy*) fry ($P > 0.05$).

Dissolved oxygen (DO)

Dissolved oxygen (DO) levels during the study were 5.26 – 5.29 ppm. According to Arie (2008) the dissolved oxygen content was between 3 – 5 ppm.

As for the range of values, average and standard deviation of dissolved oxygen levels on survival and absolute weight growth of gourami fish fingerlings (*Osphronemus gouramy*), each treatment and replication is presented in Table 9 below.

Table 9. Average DO value

	DO Range (ppm)	Average DO (ppm)	Deviation Standart (SD)
A	5,26-5,28	5,27	0,00753
B	5,27-5,28	5,27	0,00516
C	5,19-5,29	5,26	0,03656
D	5,26-5,29	5,27	0,01033

Table 10. ANOVA (Analysis of variance) test results on the degree of acidity during the study

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	,001	3	,000	,495	,690
Within Groups	,008	20	,000		
Total	,008	23			

From the table above, it can be concluded that the dissolved oxygen levels in each treatment did not have a significant effect on the survival and absolute weight growth of gourami (*Osphronemus gouramy*) fingerlings ($P > 0.05$).

CONCLUSSION AND SUGGESTION

Based on the research results, it was concluded that different stocking densities in rearing gourami fish fingerlings (*Osphronemus gouramy*) had a very real influence on the survival and absolute weight growth of gourami fish fingerlings (*Osphronemus gouramy*) and the survival rate for treatment A gave the highest results of 91.6% and the highest weight gain was in treatment A, the highest result was 3.87 grams. The water quality of all treatments during the research showed a reasonable and good enough range for the growth of gourami fish, namely pH ranging between 7.56 – 7.61, temperature ranging between 26.1 – 26.2°C, and DO ranging between 5.19 – 5.29 ppm. These three water quality parameters are homogeneous, meaning they have no effect on the survival and absolute weight growth of gourami fish (*Osphronemus gouramy*) fingerlings.

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